

# (12) UK Patent Application (19) GB (11) 2 283 012 (13) A

(43) Date of A Publication 26.04.1995

(21) Application No 9321580.4

(22) Date of Filing 20.10.1993

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(51) INT CL<sup>6</sup>  
**B65D 47/30**

(52) UK CL (Edition N )  
**B8T TWK T16A**

(56) Documents Cited  
**GB 2035276 A GB 2010790 A GB 2001302 A**  
**GB 1584603 A GB 1466436 A GB 1360919 A**

(58) Field of Search  
UK CL (Edition M ) **B8T TRE TWD TWH TWJ TWK**  
**TWR**  
INT CL<sup>5</sup> **B65D 25/46 47/04 47/06 47/08 47/30 , B67B**  
**7/12**  
Online database: wpi.

(54) **Cap and tube apparatus.**

(57) A cap and drinking tube apparatus is adapted to fit the rim of a vessel 1 in a sealed manner. The apparatus includes a tube 24 which is movable between two positions. In a first position (fig 5) the bore 243 of the tube 24 is continuous with a through hole 25 provided in the cap 2 and when the tube 24 is rotated into a second position (fig 3), the wall of the tube blocks the through-hole 25 in the cap and seals it. The apparatus further includes a detachable second tube 27 extending downwards from the through-hole 25 and adapted to be inserted into the contents of a container. In its second position the tube 24 lies in a groove 21 provided in the cap. An air hole 28 is provided through the cap and a projection 241 is provided on the tube, such that with the tube 24 in its second position the projection is inserted into the air hole.

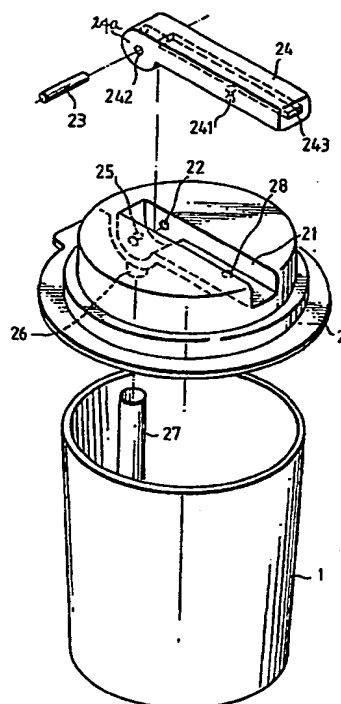


FIG. 1

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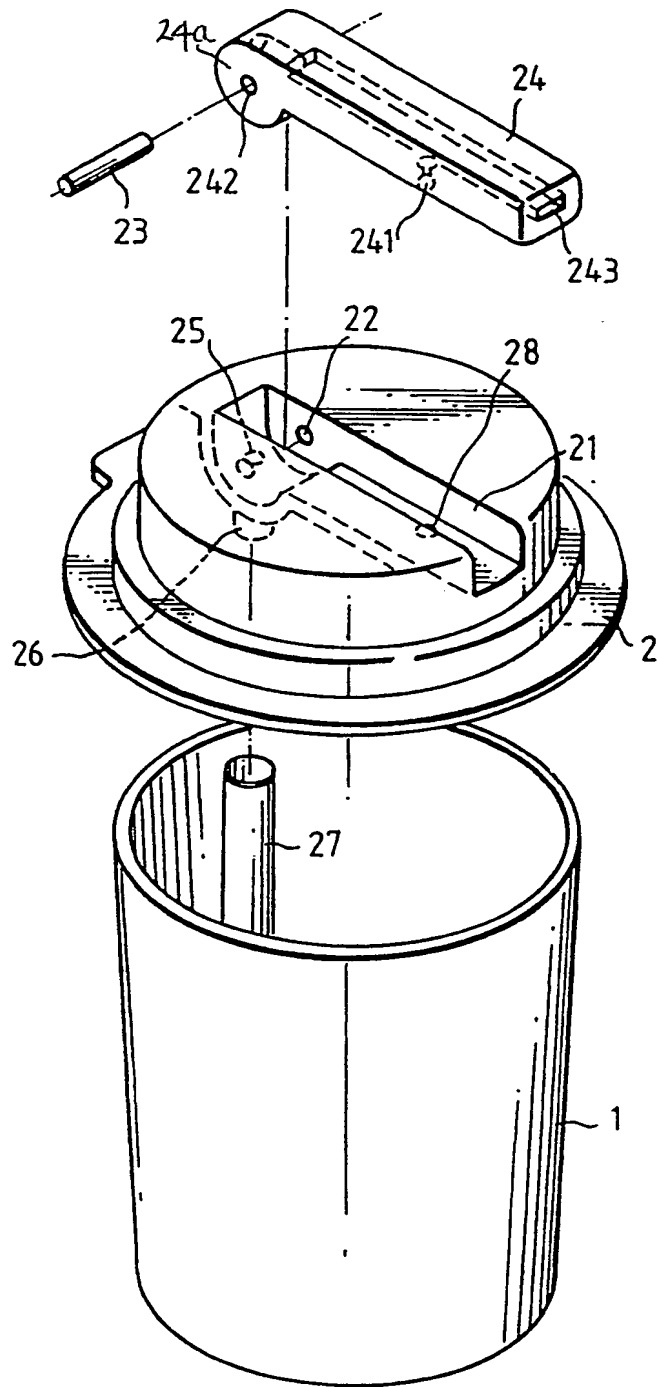


FIG. 1

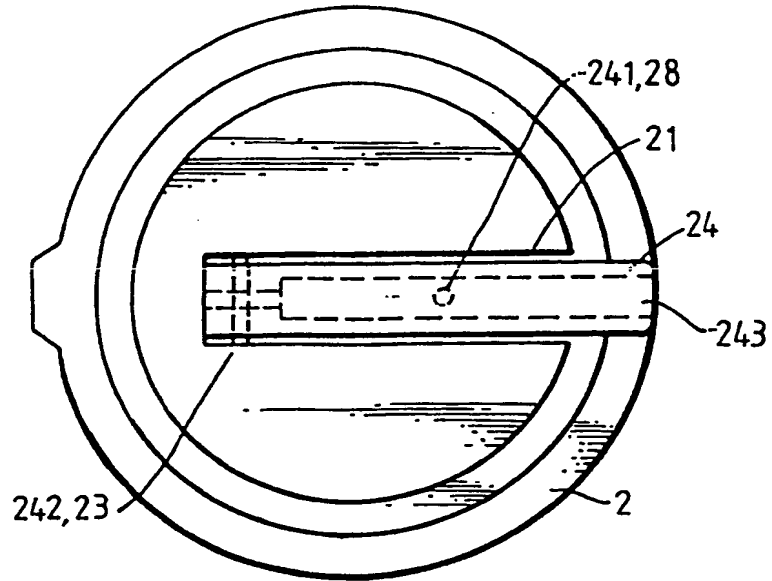


FIG. 2

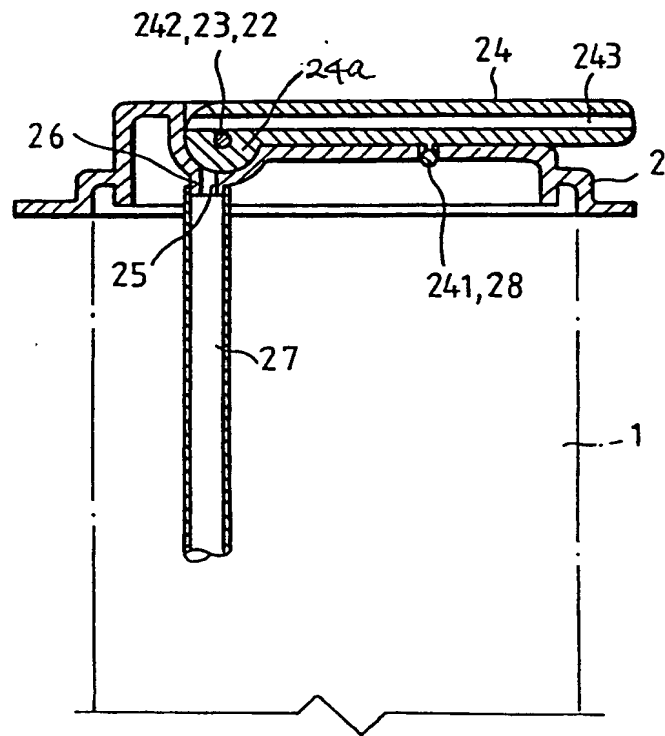


FIG. 3



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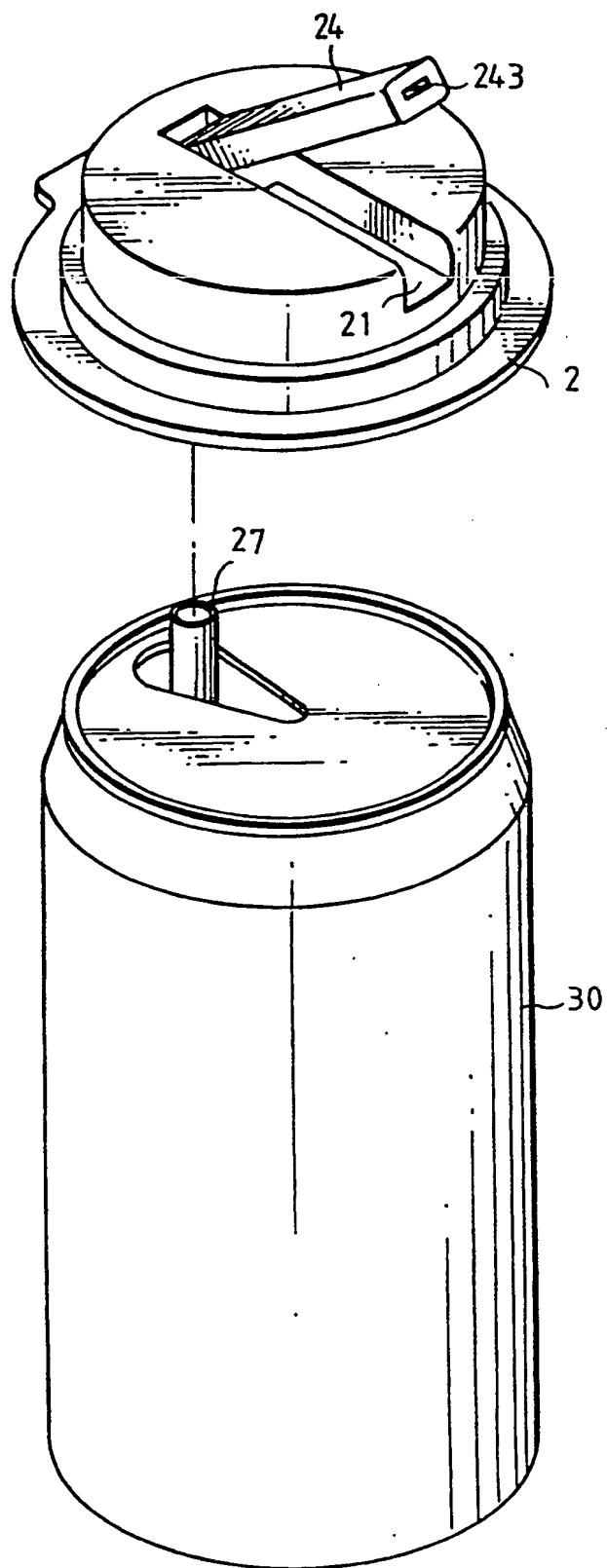


FIG. 6

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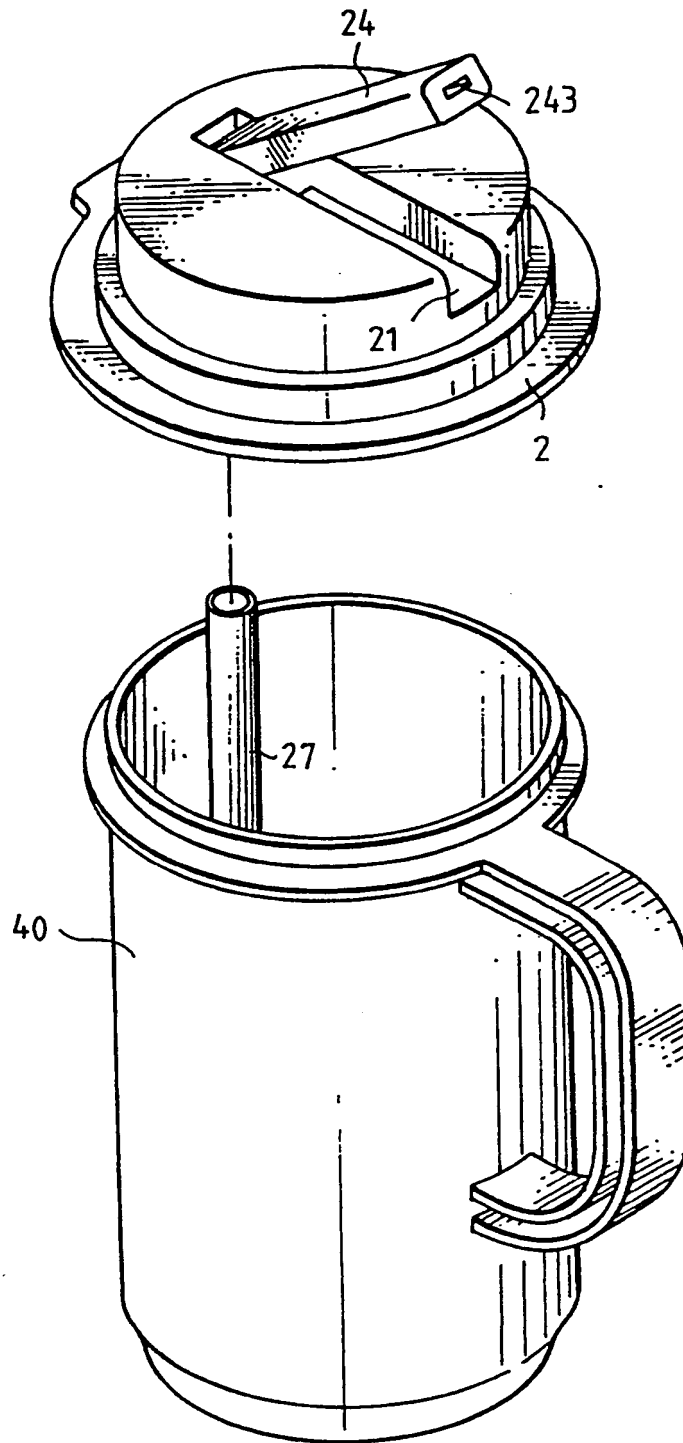
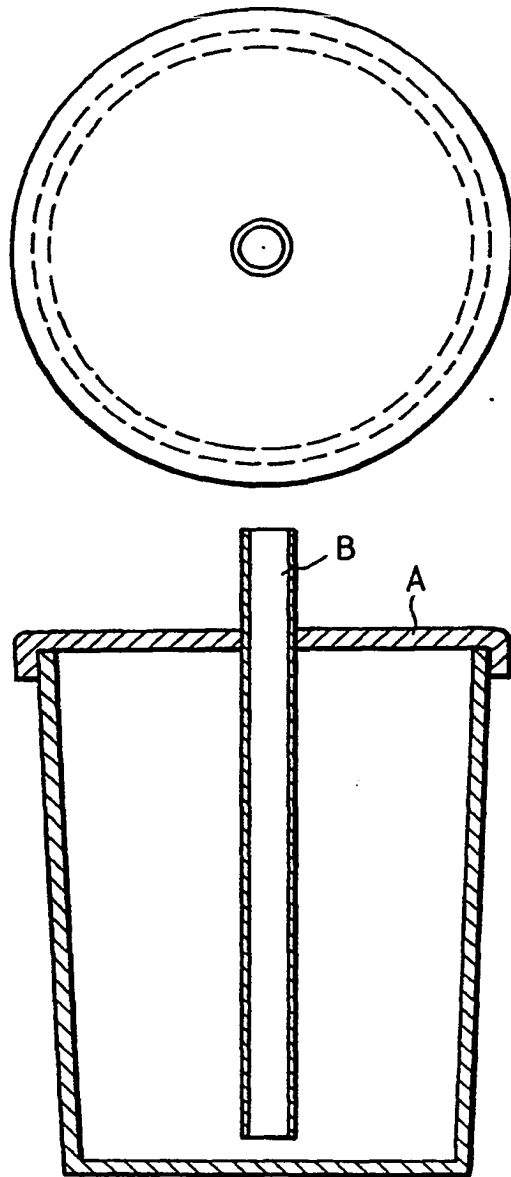


FIG. 7

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PRIOR ART

FIG. 8

Cap and Tube Apparatus

The present invention relates to a cap and tube apparatus, in particular a cap and drinking straw apparatus for application to a bottle or can.

5 In practice, as shown in Fig. 8, it is known to penetrate the cap of a container with a drinking straw in order to suck up a drink or indeed to insert a straw into the open top of a can, cup or flask for the same purpose.

10 This has disadvantages in that once opened the container can not in many cases be resealed with the original lid or seal and the contents therefore have a limited life once opened. Furthermore, drinks vessels, once opened, are liable to spillage, and even in the  
15 case of bottles which are resealable there is some inconvenience in having to remove the straw and replace the lid between drinks.

It is therefore an aim of the present invention to provide a straw apparatus in particular for a beverage  
20 container which advantageously combines the features of a straw and a seal so that the can or bottle may be easily resealed, avoiding spillage and leakage while providing an efficient means of withdrawing the contents of the vessel.

25 According to the present invention there is provided a cap for covering the opening of a container, in which the cap has a through-hole and an open-ended tube extending from the outer end of the through-hole, the tube being movable between a first configuration  
30 and a second configuration, wherein in the first configuration of the tube the bore of the tube is continuous with the through-hole and in the second configuration of the tube the through-hole is blocked.

Advantageously the cap is provided with a sealing  
35 means around its periphery and is adapted to fit in a sealed manner over a drinking vessel such as a can, cup



or bottle, and provides an airtight seal when the tube is in the second configuration and the through-hole is closed, and access to the contents of the vessel via the tube and the through-hole when the tube is in the first configuration. Advantageously the cap is provided with a pipe which extends downwardly from the through-hole into the contents of the vessel so that suction on the tube when in the first position causes the contents to transfer up the pipe and the tube and out of the vessel.

In a preferred arrangement the tube is rotatable about its end adjacent the through-hole. In an exemplary embodiment the tube is rotatable through approximately  $90^\circ$  so that in a vertical orientation relative to the cap the bore of the tube is co-axial with the through-hole and forms a continuous path with the through-hole and the pipe through which the contents of a vessel might pass. The tube may be rotated through  $90^\circ$  so as to lie in a horizontal position, the wall of the tube in the region of the pivot end acting to block the upper end of the through-hole thereby preventing the exit of the contents of the drinking vessel.

Advantageously the cap is provided with a groove adapted to the shape of the tube so that when in the horizontal position the tube fits into the groove. In one arrangement, the groove and tube are rectangular in section.

A further advantageous feature is a means of keeping the cap in its blocked condition by including a means for retaining the tube in its horizontal position within the groove.

The invention is also directed to a container including a cap and a means of attaching and sealing the cap to the container.

The invention is also directed to a method of

converting an existing container to a sealed one by applying the cap and tube apparatus.

For a better understanding of the invention and to show how the same may be put in effect, reference will  
5 now be made, by way of example, to the accompanying drawings, in which:-

Fig. 1 is a perspective view of an embodiment of the invention;

Fig. 2 is a view of the invention from above  
10 showing the cap with the tube in the lowered position.

Fig. 3 is a sectional view of the invention showing the tube in the lowered position;

Fig. 4 is a view from above showing the tube in its raised position;

15 Fig. 5 is a sectional view showing the tube in its raised position;

Fig. 6 is a perspective view of a can and the cap in accordance with the invention;

Fig. 7 is a perspective view of a cup and the cap  
20 in accordance with the invention;

Referring first to Figure 1, a cap 2 in accordance with the present invention is shown in relation to a simple drinking vessel. The cap 2 may be applied to the vessel 1 in a sealed manner so that the rim of the  
25 vessel 1 and the circular peripheral track of the cap 2 mate firmly and sealably to prevent the cap 2 coming off and to prevent leakage of the contents of the vessel 1. In the embodiment shown in the Figures the cap is provided with a peripheral groove adapted to  
30 resiliently hold the rim of a vessel.

The cap 2 is provided with a rectangular groove 21 in its upper surface which extends at one end to the peripheral edge of the cap 2 and is open and at the other end terminates within the bounds of the cap 2 and  
35 is closed. At its closed end the groove 21 is provided with a deeper concave section, the opposite side walls

of which are provided with corresponding positioning holes 22 adapted each to receive the ends of a pin 23. In the base of the concave section of the groove 21 is provided a bore-hole 25 which penetrates the cap 2. At the lower end of the bore 25 is arranged a spigot 26 which mates detachably with a tube 27 which is arranged to extend downwardly from the cap 2 and into the vessel 1. The length of the tube 27 may vary to match the dimensions of the container.

10 A rectangular tube for use as a drinking straw 24 is provided which has a bore 243 which extends throughout the length of the straw 24 and is open at either end. The straw 24 has a length greater than the radius of the cap and is adapted to lie in the groove 15 21. It is provided with an enlarged section 24a which fits into the concave section of the groove 21. A hole 242 is provided in the enlarged section, through which a hinge pin 23 passes. The hinge pin 23 is inserted at either end into positioning holes 22 in the concave 20 section so that the straw 24 is rotatable about the hinge pin axis between a vertical orientation and a horizontal orientation (lying in the groove 21). The enlarged section 24a and the deeper concave section of the groove 25 have a substantially cylindrical shape on 25 whose axis is located hinge pin 23, to allow smooth rotation of the straw 24 about the hinge pin 27. In the vertical orientation the bore 243 is continuous with the bore hole 25 through the cap 2. However, in the horizontal orientation, the wall of the enlarged 30 section 24a blocks the bore-hole 25 at its entrance thereby sealing it against the flow of the contents of the vessel 1.

The straw 24 is further provided with a projection 241 which is adapted to mate with an airhole 28 35 provided in the base of the groove 21. The airhole 28 extends right through the cap 2 and when the straw 24

is in its vertical position is open to allow the flow of air between the vessel and the exterior. When the straw 24 is closed however, the projection 241 is inserted into the airhole 28 and seals it.

5        In Figures 2 and 3, the invention is shown with the straw 24 folded down so that it lies horizontally in the groove 21. The projection 241 on the straw 24 is shown inserted into the air hole 28 in the groove 21 of the cap 2. By this means the straw 24 is held in  
10 its horizontal position and may only be raised by the exertion of some force thereby preventing the inadvertent opening of the bore-hole 25. In this horizontal position the wall of the enlarged section 24a is shown to be blocking the bore-hole 25,  
15 preventing any flow through the bore-hole 25 while the flow of air through the airhole is prevented by the projection 241.

      In Figures 4 and 5, the straw 24 is shown rotated through approximately 90° about the hinge pin 23 so  
20 that the straw 24 is in a vertical position in relation to the cap 2. When the straw 24 is in this position, the bore 243 is continuous with the bore-hole 25 of the cap 2 and allows the flow of the contents of the vessel 1 through the cap 2. To facilitate the sucking of the  
25 contents through bores 26 and 243, the air hole 28 in this orientation is open and acts as a pressure equalising hole to allow the contents of the vessel to be sucked out easily.

      In Figures 6 and 7, the invention is shown in  
30 application to a can 30 and a mug 40. However, the cap in accordance with the invention may be dimensioned so as to be applied to any vessel, not just to those used in consuming drinks. Furthermore, the cap has been described to be attachable to a container by means of a  
35 resilient mating of a groove in the cap 2 and the rim of the container. However, it is envisaged that the

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cap may be secured to the container by means of a suitably dimensioned screw fitting.

CLAIMS:

1. A cap for covering the opening of a container having a through-hole and an open-ended tube extending from the outer end of the through-hole, the tube being  
5 movable between a first configuration and a second configuration wherein in the first configuration of the tube its bore is continuous with the through-hole, and in the second configuration of the tube the through-hole is blocked.
- 10 2. A cap according to claim 1 in which in the second configuration of the tube the through-hole is blocked by the wall of the tube.
3. A cap according to claim 1 or 2 in which the tube is rotatable about its end adjacent the through-hole.
- 15 4. A cap according to claim 3 in which the angular displacement between the first position of the tube and the second position of the tube is approximately 90°.
5. A cap according to claim 3 or 4 in which the end of the tube adjacent the through-hole is substantially  
20 cylindrical in shape, the axis of the cylinder being perpendicular to the axis of the tube so as to afford the said rotation of the tube and so that in the second configuration of the tube, the cylinder wall blocks the through-hole.
- 25 6. A cap according to any preceding claim in which the tube, in its second configuration, lies in a groove provided in the cap.
7. A cap according to any preceding claim in which an air hole is provided through the cap and a projection  
30 is provided on the tube which is adapted in the second configuration of the tube to be inserted into the air hole.
8. A cap according to any preceding claim in which the cap has a seal adapted to fit over the rim of the  
35 container.
9. A cap according to any preceding claim in which a

detachable second tube is provided extending from the inner end of the through-hole of the cap so as to be insertable into the contents of a container.

10. A cap substantially as described herein with
- 5 reference to any of the accompanying Figures 1 to 7.
11. A container having a cap according to any one of the preceding claims.

<b>Patents Act 1977</b> <b>Examiner's report to the Comptroller under Section 17</b> <b>(The Search report)</b>	Application number GB 9321580.4
<b>Relevant Technical Fields</b>  (i) UK Cl (Ed.M)     B8T (TRE, TWD, TWH, TWJ, TWK, TWR) (ii) Int Cl (Ed.5)     B65D 25/46, 47/04, 47/06, 47/08, 47/30, B67B 7/12	Search Examiner KARL WHITFIELD
<b>Databases (see below)</b> (i) UK Patent Office collections of GB, EP, WO and US patent specifications.	Date of completion of Search 29 SEPTEMBER 1994
(ii) ONLINE DATABASE: WPI	Documents considered relevant following a search in respect of Claims :- 1-11

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Category	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2035276 A (POLYTOP) see especially Figure 1	1-6 and 8
X	GB 2010790 A (POLYTOP) see especially Figure 2	1-6 and 8
X	GB 2001302 A (POLYTOP) see especially Figure 2	1-6, 8 and 9
X	GB 1584603 (MENSHEIN) see especially Figure 1	1-6 and 8
X	GB 1466436 (POLYTOP) see especially Figure 4	1-6 and 8
X	GB 1360919 (POLYTOP) see especially Figure 2	1-6 and 8
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